



Diabetes Prevalence and Health Care Utilization in MaineCare

FY2003 Report



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EXECUTIVE SUMMARY

At MaineCare's request, the Maine Health Information Center (MHIC) utilized two-years of MaineCare enrollment and claims data to conduct a study of MaineCare members diagnosed with diabetes. The study incorporated information on demographics, medical payments, utilization, and use of preventive services.

- Among 202,987 MaineCare members, 14,687 (7.2 percent) were identified with diabetes.
- Members identified with diabetes represented \$242.7 million (15 percent) of FY2003 MaineCare payments.
- Among 143,299 MaineCare-Only members, 5,074 (3.5 percent) were identified as having diabetes.
- The prevalence of diabetes in MaineCare-Only members increased from 2 percent at age 20 to 6 percent at age 40, 15 percent at age 50, and 25 percent by age 60.
- Heart disease is a complication that often results from diabetes. For MaineCare-Only members, age 50 and older, more than 50 percent of the members with diabetes also had a diagnosis of heart disease.
- Payments per member per month (PMPM) for the 5,074 MaineCare-Only members with diabetes were 3 times greater than the payments for members without diabetes (\$1,447 vs. \$480).
- The rate of inpatient medical or surgical hospitalizations for members with diabetes was almost 8 times the rate for members without diabetes (0.446 PMPY vs. 0.057 PMPY).
- Among MaineCare-Only members with diabetes, members who also had heart disease averaged \$1,304 more per month in payments (\$15,642 more per year) than members with no heart disease diagnosis.
- Among MaineCare-Only members with diabetes, members who also had renal disease averaged \$2,987 more per month in payments (\$35,844 more per year) than members with no renal diagnosis.



- Information on preventive services indicated that, on the positive side, rates were comparable or higher than NCQA national Medicaid HEDIS benchmarks.
- On the negative side, a significant proportion of MaineCare members with diabetes did not have recommended preventive services.
 - 75 percent received a HbA1c test;
 - 60 percent an eye exam;
 - 69 percent a LDL-C screening;
 - 29 percent a microalbuminuria test.
- Among MaineCare-Only members with diabetes, 47 percent were using an angiotensin-converting (ACE) inhibitor or an angiotensin receptor blocker (ARB). These medications have proven effective in slowing the progression of kidney disease in people with diabetes.
- During the 2-year period, FY2002-FY2003, 22 percent of MaineCare-Only members with diabetes had a diabetes education visit.
- Members with diabetes education visits were more likely to have preventive tests and exams, and were more likely to be using blood pressure and cholesterol-reducing medication compared to members with diabetes and no diabetes education visits.
- The geographical analysis indicated that MaineCare members living in northern areas of Maine had higher prevalence rates of diabetes compared with MaineCare members living in southern areas.
- For MaineCare-Only members with diabetes, emergency department (ED) visit rates varied five-fold by geographic area.
- MaineCare-Only members with diabetes living in Pittsfield, Fort Fairfield, Caribou, Houlton, and Skowhegan had higher ED visit rates compared with members with diabetes living in other areas of the state.
- MaineCare-Only members with diabetes living in southern Maine were more likely to have a visit with an endocrinologist compared with members with diabetes living in northern and eastern Maine.



INTRODUCTION

Diabetes is one of the most prevalent and costly chronic diseases in the United States. The Centers for Disease Control and Prevention (CDC) estimates that 17.0 million people, 6.2 percent of the population in the United States have diabetes and one-third of these people are undiagnosed¹. The CDC reported the total cost of diabetes at \$92 billion of which \$40 billion is direct medical cost. It is estimated that for individuals diagnosed with diabetes at age 40 years, men will lose 11.6 life-years and women will lose 14.3 life-years².

Prevalence

The prevalence of diabetes in Maine has been steadily rising. Maine is one of

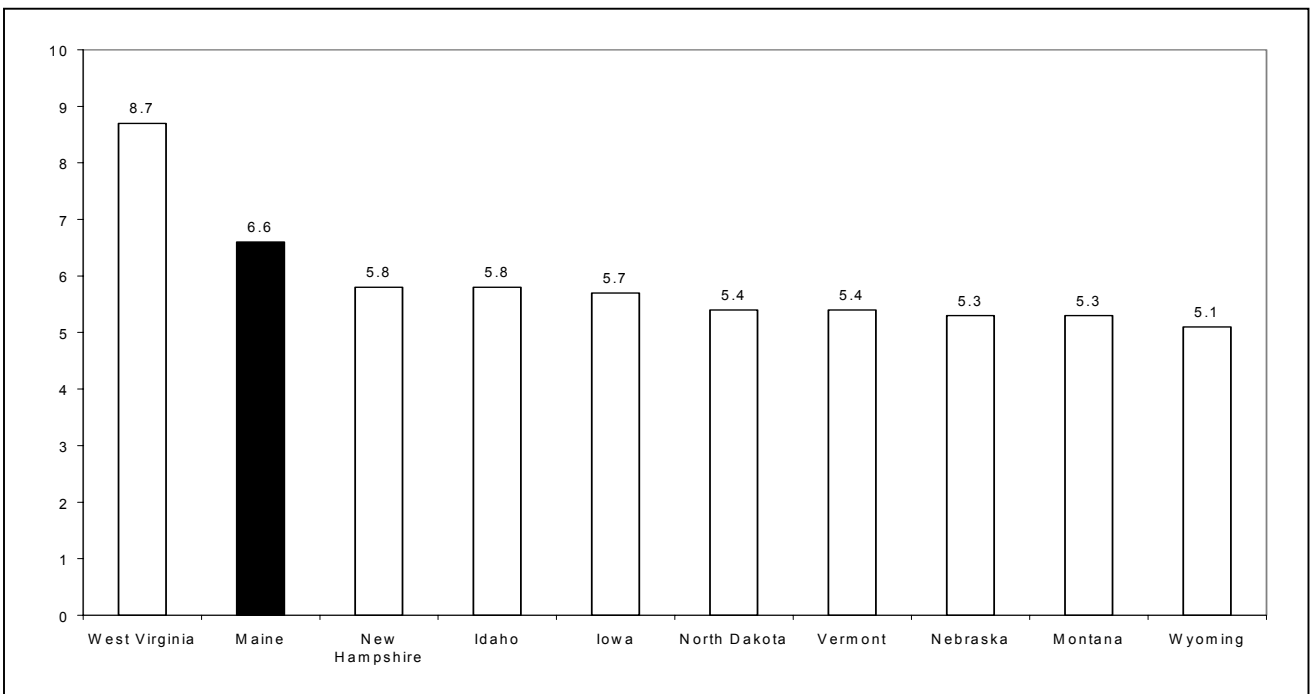


Figure 1. State comparisons of prevalence of diagnosed diabetes.

Age-adjusted prevalence per 100 population. Source: Prevalence of Diagnosed Diabetes per 100 Adult Population, by Age and State, United States 1994-2002.

<http://www.cdc.gov/diabetes/statistics/prev/state/table16.htm>



twenty-three states that experienced a 50 percent or greater increase in prevalence of non-gestational diabetes since 1994³. Approximately 70,000 Maine residents are estimated to have diabetes and Maine has the highest rate of diagnosed non-gestational diabetes in New England³. Using CDC data, rates of diagnosed diabetes in Maine were compared with other rural states with similar demographics (Figure 1). Among these ten states, Maine ranked second only to West Virginia in the prevalence rate of diagnosed diabetes. A three-year average (2000-2002) of age-adjusted BRFSS show adult prevalence in Maine at 6.2 percent³. Using BRFSS data (combined for years 1998-2000) it is estimated in Maine that 1.1 percent of persons age 18-44 are diagnosed with non-gestational diabetes, 7.2 percent of persons 45-64, 11.9 percent of persons 64-74, and 12.4 percent of persons 75 and older⁴.

Mortality and Complications from Diabetes

Diabetes is a leading cause of chronic disease mortality. Preliminary 2002 data, indicate that diabetes ranked 7th highest as a cause of death for Maine residents⁵. The number of deaths, 405, increased over the 356 deaths attributed to the disease during 2000⁶. During 2002, 3,166 Maine residents died from diseases of the heart.

Diabetes is a risk factor for heart disease. During 2002, heart disease and stroke together were the leading cause of death among Maine residents. Adults with diabetes have two to four times the risk of dying from cardiovascular disease than adults without diabetes⁷. It is estimated that the prevalence of heart disease among the U.S. population with diabetes is 24.5 percent compared to 6.6 percent among the U.S. population without diabetes; adults age 35 to 64 with diabetes are 5.1 times more likely to have heart disease compared with adults without diabetes⁸.



Accountability Measures and Goals

Prevention of complications from diabetes is only achievable with regular medical care, including recommended testing and self-management practices^{9,10}. Accountability measures of provider performance have been developed based upon evidence of best practice in diabetes care. The National Committee for Quality Assurance, Health Employer Data and Information Set (HEDIS) has developed measures used with administrative data¹¹. Healthy People (HP) 2010¹² objectives, Healthy Maine (HM) 2010¹³ outline strategies and goals for improving the health of people diagnosed with diabetes. National Committee for Quality Assurance, HEDIS Measures:

- Retinal or dilated eye exam
- HbA1c test
- LDL-C screening
- Urinary microalbuminuria test

Healthy People (HP) 2010 and Healthy Maine (HM) 2010 Goals and Objectives

- Referral to formal diabetes education (HP 5-1; HM 5-1)
- Identification of persons with undiagnosed diabetes (HP 5-4)
- Prevent kidney disease among persons diagnosed with diabetes (HP 5-11)
- Control blood glucose levels (HP 5-12, 5-17; HM 5-12)
- Prevent eye disease (HP 5-13; HM 5-13)
- Reduce deaths from cardiovascular disease in persons with diabetes (HP 5-7)
- Increase the proportion of adults who have their blood cholesterol checked (HP 12-15)
- Reduce foot ulcers and increase annual foot exams (HP 5-9, 5-14)
- Reduce the rate of lower extremity amputations (HP 5-10; HM 5-10)
- Annual dental exams (HP 5-15)
- Take aspirin at least 15 times a month (HP 5-16)



Additionally, the Task Force on Community Preventive Services strongly recommends disease management in the clinical setting, case-management, and self-management education for adults¹⁴.

The Maine Diabetes Prevention and Control Program

Beginning in 1977, Maine developed the Maine Diabetes Prevention and Control Program (DPCP), funded through CDC¹⁵. DPCP goals include:

- Improved access to, and quality of, diabetes services and care.
- Particular focus has been given to the elderly, rural, and disadvantaged populations.
- Increasing the number of persons with diabetes who receive foot exams, eye exams, vaccinations, hemoglobin A1c tests, and formal self-management diabetes education.

Against this background, MaineCare requested that the Maine Health Information Center (MHIC) utilize claims and enrollment information to identify MaineCare members with diabetes and report on their medical payments, utilization, and preventive services.



METHODS

The MHIC used enrollment and claims data from the Maine Medicaid Decision Support System (MMDSS) for this study. The experience of MaineCare members during the two-year period, July 1, 2001 - June 30, 2002 (FY2002) and July 1, 2002 – June 30, 2003 (FY2003) was evaluated. For each covered member a person-level summary record was constructed containing demographic, cost, utilization, and preventive service indicators. MaineCare members diagnosed with diabetes were identified using NCQA HEDIS 2004⁹ specifications as follows:

The member was dispensed insulin or oral hypoglycemics/antihyperglycemics during the two-year period

OR

The member had two face-to-face encounters with different dates of service in an ambulatory care setting or non-acute inpatient setting or one face-to-face encounter in an acute inpatient or emergency room setting during the two-year period with a diagnosis of diabetes.

Once members with diagnosed diabetes were identified their utilization, cost, and use of preventive services were analyzed. Detailed information on the measures developed and coding specifications are provided in Appendix 1.

Population

The MaineCare population is a diverse group of covered members who vary significantly in demographics, health status, utilization, and cost. This report focused on members with full Medicaid coverage who were continuously enrolled during the FY2003 period. Members in “State only” programs, such as the new drug program, were not included. Finally, members who had only MaineCare coverage (MaineCare-Only) were distinguished from members who had



MaineCare and Medicare coverage (dual-eligible) and members who had MaineCare and other third party liability coverage (TPL). Members who are dual-eligible or have other TPL may have some or a majority of their medical claims processed through Medicare and other insurance claims systems; these data were not available to the MHIC for this study. Therefore, the analysis of utilization and preventive services will focus on the MaineCare-Only members who were not dual-eligible and did not have other TPL coverage.

Differences in payments, inpatient and emergency room utilization, office visits, use of endocrinologists, diabetes education, HbA1c testing, eye exams, urinary microalbuminuria test, lipid tests, and foot exams are reported. Comorbid medical conditions were evaluated. Finally, differences are reported in rates of prevalence, preventive services, utilization, and cost by Hospital Service Area (HSA) of member residence.



RESULTS

The MaineCare Diabetes Study Population

A total of 390,944 MaineCare members were tracked. Of these members 113,664 were not full MaineCare coverage and 74,293 did not have continuous enrollment. Exclusion of these members resulted in a study population of 202,987.

Of the 202,987 MaineCare members with continuous enrollment and full MaineCare coverage, 14,687 (7.2 percent), were diagnosed with diabetes. Among 44,882 dual-eligible members, 9,297 (20.7 percent), were identified as having diabetes. Among 143,299 MaineCare-Only members, 5,074 (3.5 percent) were identified as having diabetes.

Table 1. Prevalence of MaineCare Members with Diabetes, FY2003

Includes members with full MaineCare coverage who were continuously enrolled (11+ months)

Study Population	Members Covered	Members meeting HEDIS Diabetes Criteria	Prevalence: Percent of Members with Diabetes
MaineCare-Only (Not TPL and Not Dual-Eligible)	143,299	5,074	3.5%
TPL & Not Dual-Eligible	14,806	316	2.1%
Dual-Eligible	44,882	9,297	20.7%
Total	202,987	14,687	7.2%

Detailed statistics on the MaineCare diabetes population by age group are provided in Figure 2 and Table 2 at the end of this report. Prevalence of diabetes increased with age. The prevalence of diabetes in MaineCare-Only members increased from 2 percent at age 20 to 6 percent at age 40, 15 percent at age 50, and



25 percent by age 60. Heart disease is a complication that often results from diabetes. For MaineCare-Only members, age 50 and older, more than 50 percent of the members with diabetes also had a diagnosis of heart disease.

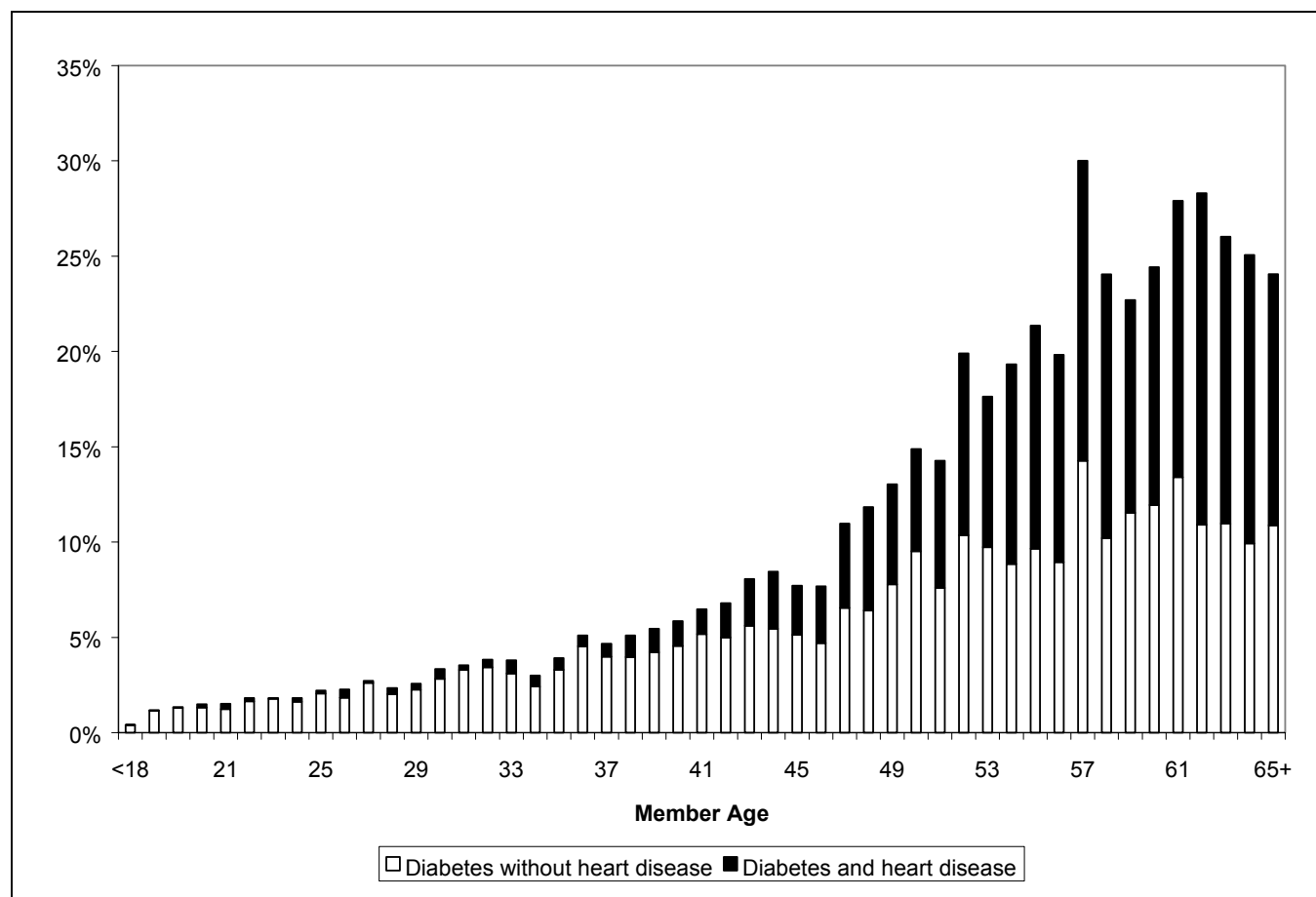


Figure 2. Age-Specific Prevalence of Diabetes and Comorbid Heart Disease: MaineCare-Only Members, FY2003.

The diabetes prevalence rate for MaineCare females, 8.2 percent, was higher than the prevalence rate for males, 5.9 percent. In total, MaineCare covered 9,525 females with diabetes and 5,162 males with diabetes during FY2003.

Among the 14,687 members with diabetes, 6,858 (47 percent) were classified as disabled. Within the MaineCare-Only group 54 percent of members with diabetes were classified as disabled.



Medical Comorbidity in the MaineCare Diabetes Population

Persons with diabetes often have other medical conditions in addition to the diabetes or develop other medical conditions as a result of complications from diabetes. Comorbid conditions often result in a significant additional burden in the use of health services and cost. Diabetes is a risk factor for heart disease. Information developed for this study on the comorbid status of MaineCare members with diabetes is provided in Table 3 below and Table 4 at the end of this report.

Table 3. Comorbid Conditions Among MaineCare Members with Diabetes, FY2003.

Comorbidity	MaineCare -Only	%	TPL & Not Dual- Eligible	%	Dual- Eligible	%
Members with Diabetes	5,074		316		9,297	
Heart disease diagnosis ¹	1,765	34.8%	57	18.0%	5,469	58.8%
At-Risk for heart disease ¹	1,192	23.5%	46	14.6%	909	9.8%
Depression diagnosis ²	1,615	31.8%	46	14.6%	1,629	17.5%
Any comorbidity ³	3,968	78.2%	143	45.3%	7,446	80.1%

¹Definitions of heart disease were developed as part of a MaineCare report on cardiovascular disease¹⁶. At-risk is based on a member with no evidence of heart disease or stroke but with a diagnosis of hypertension or dyslipidemia.

²Based on HEDIS ICD-9 diagnosis codes (296.2, 296.3, 298.0, 300.4, 309.1, 311).

³Using Elixhauser methods. See Appendix 1 for definitions and Table 4 for detailed results.

Among the 5,074 MaineCare-Only members with diabetes, 1,765 (35 percent) also had a diagnosis of heart disease. In addition, 1,192 (24 percent) members with diabetes were at-risk for diabetes with a diagnosis of high blood pressure or high cholesterol level. Among dual-eligible members with diabetes, 59 percent had heart disease.



Mental health disorders are prevalent in the MaineCare population. Using NCQA HEDIS criteria we determined the number of MaineCare members with a diagnosis of depression. Among 5,074 MaineCare-Only members with diabetes, 1,615 (32 percent) also had a diagnosis of depression.

Comorbid conditions for MaineCare members with diabetes were also tracked using Elixhauser definitions (Table 4). Among 5,074 MaineCare-Only members with diabetes, 3,968 (78 percent), had at least one comorbid condition. The most common was high blood pressure (hypertension) which occurred in 47 percent of members with diabetes. Twenty-seven percent of MaineCare-Only members with diabetes also had a chronic pulmonary disease. Diabetes is a leading cause of end-stage renal disease (ESRD). Evidence of renal failure was found for 176 MaineCare-Only and 585 dual-eligible MaineCare members with diabetes. Overall, 5 percent of MaineCare members with diabetes had evidence of renal failure. The impact of comorbid conditions on utilization and cost are explored later in this report.

The Impact of Diabetes on Utilization and Medical Cost

Table 5 below and Table 6 at the end of this report provide information on the utilization, cost, and use of preventive services for members with diabetes. During FY2003, members with diabetes represented 7 percent of MaineCare members and 15 percent of total payments. In total, members with diabetes incurred \$242 million in FY2003 MaineCare payments. Dual eligible members with diabetes accounted for \$151 million in payments, MaineCare-Only members \$88 million, and TPL members \$3 million.



Table 5. Summary of Cost for MaineCare Members with Diabetes, FY2003

Study Population	Members	% members	Payments Millions	% Payments
Total	202,987	100%	\$1,636.4	100%
Members With Diabetes	14,687	7%	\$242.7	15%
MaineCare-Only	5,074	2%	\$88.1	5%
Dual Eligible	9,297	5%	\$151.4	9%
TPL	316	0%	\$3.2	0%
Members Without Diabetes	188,300	93%	\$1,393.7	85%
MaineCare-Only	138,225	68%	\$795.6	49%
Dual Eligible	35,585	18%	\$532.0	33%
TPL	14,490	7%	\$66.1	4%

Comparisons of members with and without diabetes will focus on the MaineCare-Only population with complete claims data; complete claims data is not available for dual eligible or TPL members. Payments per member per month (PMPM) for the 5,074 MaineCare-Only members with diabetes were 3 times greater than the payments for members without diabetes (\$1,447 vs. \$480). Some of this difference was due to the older average age of MaineCare-Only members with diabetes (45 vs. 21). However, when statistical adjustment was made for age differences, members with diabetes still averaged \$800 more per month compared to members without diabetes.

MaineCare-Only members with diabetes incurred 7,908 hospital ED visits that did not result in hospitalization, at an average cost of \$287 per visit. They incurred 35,949 office visits, and 2,261 inpatient medical or surgical hospitalizations during FY2003. The rate of ED visit for members with diabetes was almost 2 times the rate for members without diabetes (1.559 PMPY vs. 0.823 PMPY). The rate of inpatient medical or surgical hospitalizations for members with diabetes was almost 8 times the rate for members without diabetes (0.446 PMPY vs. 0.057 PMPY).



Among the 5,074 MaineCare-Only members with diabetes, 1,430 (28 percent) had an encounter with a mental health specialist for a total of 27,412 visits with mental health specialists. Only six percent of the members with diabetes had a visit with an endocrinologist. Thirty-six of the MaineCare-Only members with diabetes had an amputation of the lower extremity during FY2003. Thirty-six (0.71 percent) of MaineCare-Only members with diabetes died. Among dual-eligible members with diabetes, 58 had a lower extremity amputation. Among dual-eligible members with diabetes, 417 died.

The Impact of Comorbid Medical Conditions on Diabetes Utilization and Cost

Information on the impact of comorbid medical conditions among MaineCare-Only members with diabetes is provided in Table 7 at the end of this report. Among the 5,074 MaineCare-Only members with diabetes, 3,968 (78 percent), had at least one comorbid medical condition. MaineCare-Only members with diabetes and a comorbid medical condition cost 3.5 times as much as members with diabetes without a comorbid medical condition (\$1,714 PMPM vs. \$489 PMPM). Annually, they averaged more emergency department visits (1.792 vs. 0.720), more office visits (8.008 vs. 3.775), and more inpatient medical or surgical hospitalizations (0.540 vs. 0.108) than those members with diabetes without a comorbid condition.

Diabetes is a risk factor for heart disease. Among MaineCare-Only members with diabetes, members who also had heart disease averaged \$1,304 more per month in payments (\$15,642 more per year) than members with no heart disease diagnosis. Members with diabetes and heart disease were 1.6 times more likely to have an inpatient medical or surgical hospitalization during FY2003 compared to



members with diabetes and no heart disease diagnosis. These results suggest the potential impact on cost of preventing the development of heart disease in MaineCare members with diabetes.

HEDIS and Other Preventive Measures

A number of preventive measures were evaluated for members with diabetes. Four NCQA HEDIS Comprehensive Diabetes Care measures were studied for MaineCare-Only members using the MMDSS administrative claims data. Results are provided below and compared with the most current NCQA HEDIS national Medicaid results¹⁶:

- HbA1c Testing: MaineCare 75 percent, NCQA HEDIS Medicaid 72.0 percent
- Eye Exams: MaineCare 60 percent; NCQA HEDIS Medicaid 46.0 percent
- LDL-C Screening: MaineCare 69 percent; NCQA HEDIS Medicaid 70.0 percent
- Monitoring Diabetic Nephropathy (microalbuminuria test): MaineCare 29 percent; NCQA HEDIS Medicaid 47.5 percent.

Among the 5,074 MaineCare-Only members with diabetes, 3,788 (75 percent) received a blood glucose test, 3,482 (69 percent) a lipid screen, 3,048 (60 percent) an eye exam, and 1,491 (29 percent) a microalbuminuria test. The results indicate that a significant proportion of MaineCare members with diabetes may not have received recommended comprehensive care for diabetes. However, for most measures MaineCare members scored higher than national Medicaid NCQA benchmarks.



Among MaineCare-Only members with diabetes, rates of these preventive services were higher for older members compared to younger members. Preventive service rates were slightly higher for women with diabetes compared with men with diabetes.

Comparing results to HEDIS national benchmarks should be made with caution since most health plans reporting to NCQA supplement administrative claims data with medical chart data – a process known as the “hybrid” method. With the support of the Maine Diabetes Prevention and Control Program, the Maine Health Information Center acquired supplemental information from NCQA to determine the potential impact of the “hybrid” method on the measures¹⁷. Based on the supplemental information provided by NCQA, the administrative-only proportion of the national Medicaid HEDIS rates were as follows: HbA1c (59.8 percent), eye exam (36.5 percent), LDL-C (56.1 percent), and monitoring nephropathy (35.4 percent). We also note that the nephropathy measure cannot be directly compared to NCQA since it requires actual test results that were not available for this study. With these caveats, the MaineCare rates were higher than national NCQA Medicaid rates.

Diabetes is a risk factor for heart disease. Among MaineCare-Only members with diabetes, 71 percent utilized some form of cardiac medication during FY2003. Forty-nine percent used a blood pressure medication while 43 percent used a cholesterol reducing medication.

People with diabetes are prone to foot problems because complications of the disease can damage their blood vessels and nerves. A foot injury may go unnoticed until severe infection develops. Diabetes also alters the immune system, thus decreasing the body's ability to fight infection. Small infections can rapidly



progress to death of the skin and other tissues (necrosis), which may require amputation of the affected limb to save the patient's life. Foot problems can be prevented with improved blood sugar control. Among the 5,074 MaineCare-Only members with diabetes, 954 (19 percent) had evidence of a foot exam. We note that identifying foot exams may be limited by incomplete coding of the procedure on administrative claims. Thirty-six members had a lower extremity amputation.

Diabetes is the most common cause of kidney failure. Angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs), have proven effective in slowing the progression of kidney disease in people with diabetes. Among MaineCare-Only members with diabetes, 47 percent were using an ACE or ARB medication. When analysis was subset to focus on 176 MaineCare-Only members with diabetes and evidence of renal failure, the rate of ACE or ARB use increased to 82 percent. The progression to kidney disease has significant implications for utilization and cost. Of the 5,074 MaineCare-Only members with diabetes, the 176 members with renal disease incurred \$9.1 million in payments. The 176 MaineCare-Only members with diabetes and renal disease averaged \$2,987 more per month in payments (\$35,844 more per year) than members with no renal diagnosis. They were 6 times more likely to have an inpatient hospitalization and 46 percent of these members total cost was due to inpatient care. This underscores the scope of the problem associated with complications that result from diabetes in the MaineCare population.

The Impact of Diabetes Education

Diabetes education rates are reported in Table 8 at the end of this report. Among the 5,074 MaineCare-Only members with diabetes, 1,133 (22 percent) had



diabetes education during the two-year period FY2002-FY2003. MaineCare-Only members with any diabetes education had higher rates of use of preventive services compared with members with diabetes and no diabetes education visits. As displayed in Figure 3 below, members with any diabetes education were more likely to have:

- HbA1c test (92 percent vs. 70 percent),
- LDL-C screen (77 percent vs. 66 percent),
- Eye exam (74 percent vs. 56 percent),
- Microalbuminuria test (46 percent vs. 24 percent),
- Foot exam (24 percent vs. 17 percent), or
- ACE Inhibitor or ARB medication (51 percent vs. 46 percent).

The higher rates for members with education were all statistically significant ($p < .01$).

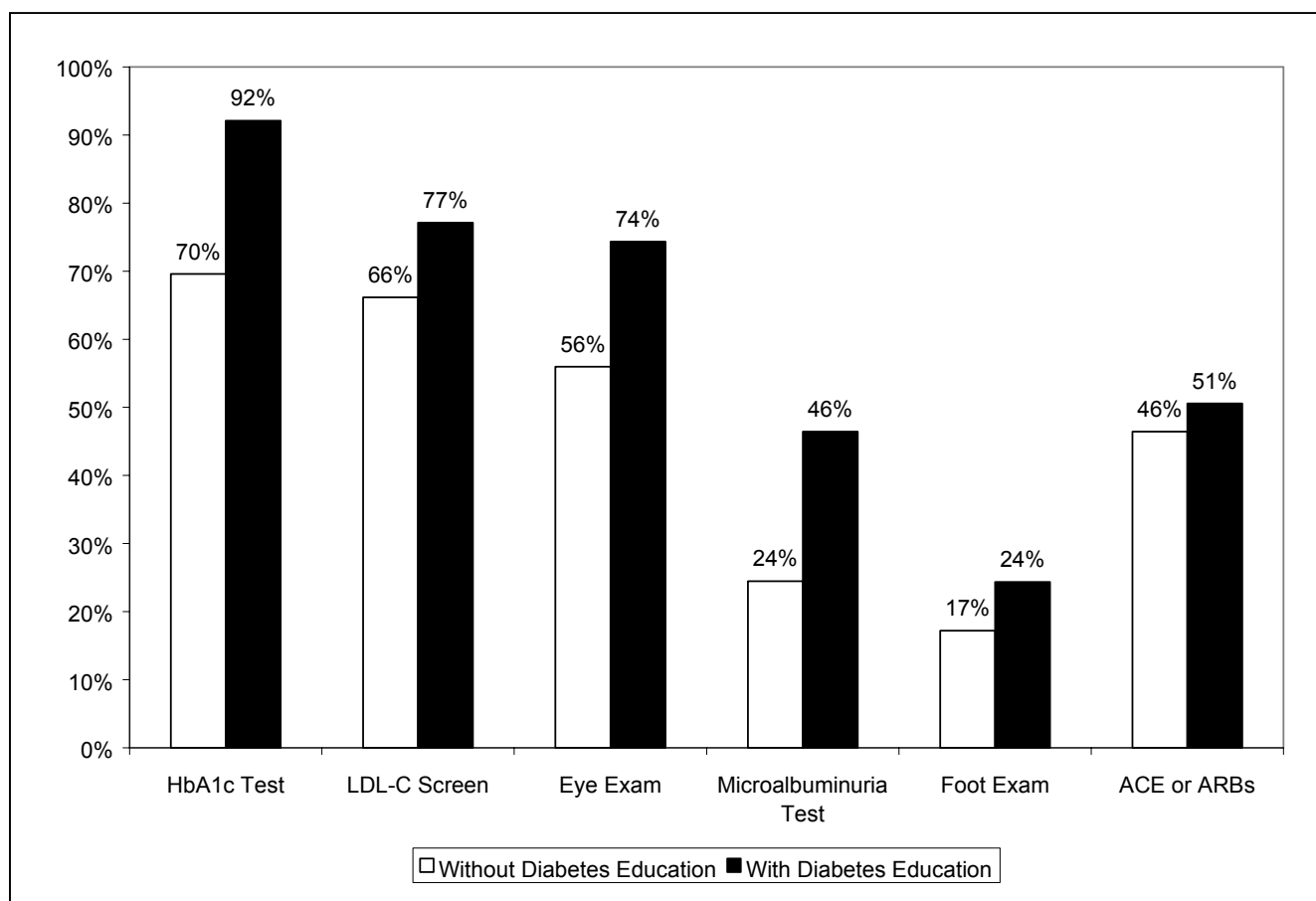


Figure 3. Diabetes Education and Use of Preventive Services: MaineCare-Only Members, FY2003.

Diabetes, MaineCare – Maine Health Information Center, 8/5/2004



The impact of diabetes education on cost for the MaineCare-Only members was evaluated. Because of the potential lag effect of diabetes education on cost, a comparison was made on the impact of diabetes education during FY2002 on utilization and payments during FY2003. Members with diabetes education had lower inpatient hospitalization rates (0.400 PMPY vs. 0.451 PMPY) and lower inpatient payments per member per month (\$322 vs. \$401) compared with members with no diabetes education visits.

Table 9. Impact of Diabetes Education on Inpatient Utilization
MaineCare-Only (not TPL and not dual-eligible) members with diabetes.

Any Diabetes Education During FY2002	Members with Diabetes	FY2003 Inpatient Payments PMPM	FY2003 Inpatient Med / Surg Hospitalization Rate Per Member Per Year
No	4,497	\$401	0.451
Yes	577	\$322	0.400

A multivariate regression analysis, controlling for age and comorbid medical condition, confirmed that the members with any diabetes education during FY2002 had lower FY2003 inpatient use and payments compared to the members who did not have any diabetes education.

The result of a regression analysis indicated that, after controlling for age and comorbidity, members with any diabetes education during FY2001 averaged \$940 less in FY2003 inpatient hospital payments than other members with diabetes.

Geographical Variation in Diabetes Study Indicators

Diabetes study measures are reported by the HSA (Hospital Service Area) of the member's residence in Tables 10 through 15 at the end of this report. Among MaineCare-Only members (Table 10), the prevalence of diabetes was 3.5 percent.



Members living in Presque Isle (5.1 percent) and Houlton (5.0 percent) had a prevalence of diabetes that was more than double the prevalence for members living in the Berwicks (2.3 percent) and York (2.4 percent). Prevalence of diabetes among MaineCare-Only members was higher in northern and eastern Maine than in the southern part of the state. Prevalence rates, adjusted for age differences, confirmed these results and indicate higher diabetes disease prevalence in northern and eastern Maine.

Table 11 provides similar prevalence for all MaineCare members; this includes Dual Medicare Eligible, TPL, and MaineCare-Only members. The prevalence of MaineCare members with diabetes living in Fort Kent (10.7 percent), Caribou (10.2 percent), Presque Isle (9.4 percent), Fort Fairfield (9.1 percent), and Calais (9.1 percent) was higher than the prevalence among members living in York (5.3 percent), Berwicks (5.5 percent), and Bath (5.9 percent). Prevalence of diabetes among MaineCare-Only members was higher in northern and eastern Maine than in the southern part of the state. With the inclusion of dual eligible members, there were demographic differences between HSAs that contributed to part of the variations in prevalence. For example, the average age of members covered in Fort Kent was 39.1 compared to 26.8 in the Berwicks. Statistical adjustment for these age differences was made and age-adjusted prevalence rates are provided in Table 11 at the end of this report. While the variation between HSAs was reduced, northern Maine areas still had higher prevalence rates than southern Maine areas. This, again, suggests that MaineCare members living in northern Maine areas have higher diabetes disease prevalence compared with MaineCare members living in southern Maine areas.

Table 12 at the end of this report provides utilization statistics for MaineCare-Only members with diabetes by the HSA of their residence. The 5,074 members



with diabetes incurred 7,908 hospital emergency department visits, 35,949 physician office visits, and 2,261 inpatient hospitalizations during FY2003. For MaineCare-Only members with diabetes, emergency department visit rates varied five-fold; from 3.136 per member per year in Pittsfield to 0.609 in Damariscotta. MaineCare-Only members with diabetes living in Pittsfield, Fort Fairfield, Caribou, Houlton, and Skowhegan had higher ED visit rates compared with members with diabetes living in other areas of the state. Pittsfield HSA also had a high rate of inpatient hospitalization for members with diabetes.

Table 13 at the end of this report provides preventive service rates for MaineCare-Only members with diabetes. Rates of members with diabetes education ranged from 42 percent in Fort Kent to 9 percent in Machias. Among larger populations, 29 percent of members with diabetes living in Waterville received diabetic education compared to 14 percent of members living in Biddeford. HbA1c test rates ranged from 88 percent in Blue Hill to 58 percent in Machias. LDL-C, eye exam, microalbuminuria test, and foot exam rates are provided by HSA in Table 13 at the end of this report.

Table 14 at the end of the report provides information on payments for MaineCare-Only members with diabetes as a percent of total payments. Of \$883.7 million in MaineCare payments, \$88.1 million (10 percent) was incurred by members with diabetes. Members with diabetes represented a higher proportion of total payments for the members living in Fort Fairfield (17 percent) compared with members living in Brunswick (5 percent). Among members living in Fort Fairfield, members with diabetes accounted for 34 percent of hospital inpatient payments. MaineCare-Only, Dual Medicare Eligible, and TPL member data are combined in Table 15 at the end of this report. Of \$1,636.4 million in MaineCare payments, \$242.7 million (15 percent) was incurred by members with diabetes.



Northern and eastern Maine areas have a higher proportion of total cost associated with members with diabetes compared to southern Maine areas.

The likelihood of a MaineCare member with diabetes visiting an endocrinologist varied 17-fold geographically. MaineCare-Only members with diabetes living in southern Maine were more likely to have a visit with an endocrinologist compared with members with diabetes living in northern and eastern Maine. While the MaineCare average was 6 percent, the rates for the Berwicks (17 percent), Portland (14 percent), Brunswick (13 percent), York (13 percent), Sanford (12 percent), Bath (12 percent), and Biddeford (11 percent) were higher. By comparison one percent of members with diabetes living in Calais or Machias had a visit with an endocrinologist. This may be an access issue worthy of further study.

DISCUSSION

Diabetes is a prevalent and costly disease in the MaineCare program. Among 202,987 MaineCare members, 14,687 (7.2 percent) were identified with diabetes. In total, members identified with diabetes represented \$242.7 million (15 percent) of FY2003 MaineCare payments. It is not known how many additional MaineCare members have diabetes but are not yet diagnosed. These numbers provide evidence that diabetes has a significant impact on the MaineCare program worthy of interventions.

Among MaineCare members with diabetes, a high proportion (close to 80 percent) had some comorbid condition. Mental health and substance abuse problems were common in MaineCare members with diabetes. Diabetes is a risk factor for heart disease and 35 percent of MaineCare-Only and 59 percent of dual



Medicare eligible members with diabetes had heart disease. An additional 24 percent of MaineCare-Only members with diabetes had a high blood pressure or high cholesterol diagnosis indicating they were potentially at risk to develop heart disease. Members with diabetes and heart disease averaged more than \$15,000 a year more in payments than members with diabetes but no heart disease diagnosis. Since heart disease is preventable among people with diabetes, this suggests the potential for cost savings from prevention efforts.

MaineCare members with diabetes utilized the hospital emergency department at 2 times the rate of other members and had 8 times the number of inpatient hospitalizations. Even after adjusting for age differences, MaineCare members with diabetes averaged \$800 more per month in payments compared with other MaineCare members.

Information on preventive services indicated that, on the positive side, rates were comparable or higher than NCQA national HEDIS benchmarks. On the negative side, a significant proportion of MaineCare members with diabetes did not have recommended preventive services as identified in the administrative claims data. During the 2-year period, FY2002-FY2003, 22 percent of MaineCare-Only members with diabetes had a diabetes education visit. Members with diabetes education visits were more likely to have preventive tests and exams, and were more likely to be using blood pressure and cholesterol-reducing medication compared to members with diabetes and no diabetes education visits. The positive impact of diabetes education on preventive services has been reported in other studies¹⁸.

Diabetes is the most common cause of kidney failure and ACE inhibitors and ARB medications have proven effective in slowing the progression of kidney



disease. We reported that 176 MaineCare-Only members with diabetes and renal disease averaged \$35,844 more in payments per year. This was three times the average cost of members with diabetes and no evidence of renal disease. While this report has not focused on the dual Medicare eligible population, we also identified 585 dual Medicare eligible members with diabetes and a renal disease diagnosis. This underscores the scope of the problem associated with complications that result from diabetes in the MaineCare population.

The geographical analysis suggested that MaineCare members living in northern areas of Maine had higher prevalence rates of diabetes compared with MaineCare members living in southern areas. Utilization and preventive service rates varied by geographical area. In some cases, areas with higher emergency department visit rates also had higher office visit rates. In other areas with high emergency department visit rates were associated with low office visit rates.

Among members with diabetes, emergency department and hospitalization rates were higher. These findings indicate that an encounter at a Maine hospital is an opportunity for intervention and underscore the importance of educating members with diabetes and managing their care. One recent study demonstrated that continuity of care was associated with better glycemic control among people with diabetes¹⁹. Efforts to promote a “medical home” for all MaineCare members with diabetes may help reduce hospital use rates. Recognizing this need, MaineCare initiated the MaineCare Diabetes Registry Program during October, 2003. The purpose of this program was to identify MaineCare members diagnosed with diabetes and ensure that these members received the recommended preventative care measures.



Table 2
MaineCare Diabetes Status by Age and Gender, FY2003
Full MaineCare with Continuous Enrollment

Age Group	Gender	Members	Members meeting HEDIS Diabetes Criteria	Percent with Diabetes
Total		202,987	14,687	7.2%
<u>MaineCare-Only (Total)</u>		143,299	5,074	3.5%
0-17	Male	36,493	127	0.3%
18-44	Male	19,033	546	2.9%
45-64	Male	5,959	928	15.6%
65 and older	Male	274	60	21.9%
0-17	Female	33,846	162	0.5%
18-44	Female	37,604	1,404	3.7%
45-64	Female	9,565	1,721	18.0%
65 and older	Female	499	126	25.3%
<u>TPL & Not Dual-Eligible (Total)</u>		14,806	316	2.1%
0-17	Male	4,657	20	0.4%
18-44	Male	1,948	41	2.1%
45-64	Male	291	35	12.0%
65 and older	Male	41	14	34.1%
0-17	Female	4,036	30	0.7%
18-44	Female	3,185	93	2.9%
45-64	Female	519	57	11.0%
65 and older	Female	125	26	20.8%
<u>Dual-Eligible (Total)</u>		44,882	9,297	20.7%
0-17	Male	336	2	0.6%
18-44	Male	5,268	438	8.3%
45-64	Male	5,959	1,219	20.5%
65 and older	Male	6,566	1,732	26.4%
0-17	Female	332	1	0.3%
18-44	Female	4,307	414	9.6%
45-64	Female	5,897	1,320	22.4%
65 and older	Female	16,216	4,171	25.7%
There were 31 members with unknown age or gender.				



Table 4
MaineCare Diabetes Status by Comorbid Medical Conditions, FY2003
Full MaineCare with Continuous Enrollment

Comorbidity	MaineCare-Only		TPL & Not Dual-		Dual-Eligible	
			Eligible			
Members with diabetes	N=5,074		N=316		N=9,297	
Any comorbid condition (Elixhauser definitions)	3,968	78.2%	143	45.3%	7,446	80.1%
Hypertension	2,396	47.2%	62	19.6%	4,457	47.9%
Chronic pulmonary disease	1,397	27.5%	23	7.3%	2,421	26.0%
Depression	1,394	27.5%	31	9.8%	1,343	14.4%
Psychoses	1,003	19.8%	28	8.9%	1,520	16.3%
Hypothyroidism	597	11.8%	21	6.6%	723	7.8%
Fluid and electrolyte disorders	474	9.3%	10	3.2%	784	8.4%
Deficiency anemias	467	9.2%	12	3.8%	1,014	10.9%
Congestive heart failure	331	6.5%	11	3.5%	1,598	17.2%
Drug abuse	277	5.5%	1	0.3%	259	2.8%
Cardiac arrhythmias	255	5.0%	5	1.6%	1,060	11.4%
Alcohol abuse	232	4.6%	0	0.0%	216	2.3%
Peripheral vascular disorders	221	4.4%	6	1.9%	628	6.8%
Renal failure	176	3.5%	5	1.6%	585	6.3%
Solid tumor without metastasis	168	3.3%	5	1.6%	662	7.1%
Liver disease	144	2.8%	1	0.3%	150	1.6%
Valvular disease	133	2.6%	2	0.6%	436	4.7%
Other neurological disorders	110	2.2%	4	1.3%	322	3.5%
Rheumatoid arthritis/collagen vascular diseases	99	2.0%	2	0.6%	233	2.5%
Coagulopathy	88	1.7%	1	0.3%	153	1.6%
Paralysis	46	0.9%	5	1.6%	169	1.8%
Metastatic cancer	39	0.8%	3	0.9%	75	0.8%
Peptic ulcer disease excluding bleeding	38	0.7%	1	0.3%	59	0.6%
Obesity	36	0.7%	0	0.0%	43	0.5%
Lymphoma	32	0.6%	0	0.0%	60	0.6%
Pulmonary circulation disorders	30	0.6%	0	0.0%	75	0.8%
Weight loss	26	0.5%	0	0.0%	26	0.3%
Blood loss anemia	20	0.4%	1	0.3%	65	0.7%
AIDS: Acquired immune deficiency syndrome	9	0.2%	0	0.0%	21	0.2%

A member must have at least two encounters with the diagnosis to be counted as a having the comorbidity. A member can be counted in more than one comorbidity category.



Table 6
MaineCare Diabetes Status, Utilization, and Cost, FY2003
MaineCare-Only Members (dual eligible and TPL members not included)

Measure	All MaineCare- Only Members	Members Without Diabetes (All Ages)	Members without Diabetes (Age 45 and Older)	Members With Diabetes
Demographics				
Members	143,299	138,225	13,463	5,074
Average Age	22	21	53	45
Payments				
Payments (millions)	\$884	\$796	\$122.9	\$88
Payments Per Member Per Month (PMPM)	\$514	\$480	\$761	\$1,447
Percent of Payments for Hospital Inpatient Care	15%	14%	21%	27%
Utilization				
Emergency Department Visits	121,626	113,718	10,449	7,908
ED Visit Rate Per Member Per Year (PMPY)	0.849	0.823	0.776	1.559
Average Cost per ED Visit	\$223	\$218	\$288	\$287
Office Visits	505,287	469,338	60,315	35,949
Office Visit Rate PMPY	3.526	3.395	4.480	7.085
Medical / Surgical Hospitalizations	10,078	7,817	2,410	2,261
Med/Surg Hospitalization Rate PMPY	0.070	0.057	0.179	0.446
Percent with any mental health specialist visit	19%	19%	21%	28%
Percent of Members with Any Endocrinologist Visit (current or prior year)	1%	1%	1%	6%
Preventive Measures				
Percent with any cardiac medication	13%	11%	43%	71%
Percent with antihypertension medication	7%	5%	17%	49%
Percent with antihyperlipid medication	4%	3%	19%	43%
Percent with any diabetes education (current or prior year)	1%	0%	0%	22%
Percent with Foot Examination	4%	4%	8%	19%
HEDIS Preventive Measures				
Percent with HBA1C Test (current year)	4%	1%	4%	75%
Percent with LDL-C Screen (current or prior year)	14%	12%	41%	69%
Percent with Eye Exam (current or prior year)	33%	32%	39%	60%
Percent with Microalbuminuria Test (current year)	1%	0%	1%	29%
Other measures				
Members with a lower extremity amputation	49	13	6	36
Percent Mortality	0.13%	0.10%	0.71%	0.71%
Med/Surg hospitalizations do not include hospitalizations for mental health, substance abuse or maternity.				



Table 7
MaineCare Diabetes, Comorbidity, Utilization, and Cost, FY2003
MaineCare-Only Members (dual eligible and TPL members not included)

Measure	MaineCare-Only Members with Diabetes	Members With Diabetes and No Comorbid	Members With Diabetes and Comorbid
Demographics			
Members	5,074	1,106	3,968
Average Age	45	37	47
Payments			
Payments (millions)	\$88	\$6	\$82
Payments Per Member Per Month (PMPM)	\$1,447	\$489	\$1,714
Percent of Payments for Hospital Inpatient Care	27%	16%	28%
Utilization			
Emergency Department Visits	7,908	796	7,112
ED Visit Rate Per Member Per Year (PMPY)	1.559	0.720	1.792
Average Cost per ED Visit	\$287	\$246	\$292
Office Visits	35,949	4,175	31,774
Office Visit Rate PMPY	7.085	3.775	8.008
Medical / Surgical Hospitalizations	2,261	120	2,141
Med/Surg Hospitalization Rate PMPY	0.446	0.108	0.540
Percent with any mental health specialist visit	28%	10%	33%
Percent of Members with Any Endocrinologist Visit (current or prior year)	6%	9%	6%
Preventive Measures			
Percent with any cardiac medication	71%	40%	80%
Percent with antihypertension medication	49%	22%	57%
Percent with antihyperlipid medication	43%	24%	48%
Percent with any diabetes education (current or prior year)	22%	19%	23%
Percent with Foot Examination	19%	9%	22%
HEDIS Preventive Measures			
Percent with HBA1C Test (current year)	75%	59%	79%
Percent with LDL-C Screen (current or prior year)	69%	47%	75%
Percent with Eye Exam (current or prior year)	60%	48%	64%
Percent with Microalbuminuria Test (current year)	29%	22%	31%
Other measures			
Members with a lower extremity amputation	36	2	34
Percent Mortality	0.71%	0.09%	0.88%

Med/Surg hospitalizations do not include hospitalizations for mental health, substance abuse or maternity.



Table 8
MaineCare Diabetes Education by Age and Gender, FY2002-FY2003
Full MaineCare with Continuous Enrollment

Age Group	Gender	Members with Diabetes	Members with Diabetes with Any Education Visit	Percent with Any Diabetes Education
Total		14,687	2,280	15.5%
<u>MaineCare-Only (Total)</u>		5,074	1,133	22.3%
0-17	Male	127	40	31.5%
18-44	Male	546	123	22.5%
45-64	Male	928	186	20.0%
65 and older	Male	60	4	32.7%
0-17	Female	162	53	23.3%
18-44	Female	1,404	327	22.7%
45-64	Female	1,721	391	7.1%
65 and older	Female	126	9	
<u>TPL & Not Dual-Eligible (Total)</u>		316	47	14.9%
0-17	Male	20	8	40.0%
18-44	Male	41	8	19.5%
45-64	Male	35	2	5.7%
65 and older	Male	14	0	0.0%
0-17	Female	30	13	43.3%
18-44	Female	93	8	8.6%
45-64	Female	57	8	14.0%
65 and older	Female	26	0	0.0%
<u>Dual-Eligible (Total)</u>		9,297	1,100	11.8%
0-17	Male	2	1	50.0%
18-44	Male	438	95	21.7%
45-64	Male	1,219	200	16.4%
65 and older	Male	1,732	114	6.6%
0-17	Female	1	0	0.0%
18-44	Female	414	110	26.6%
45-64	Female	1,320	273	20.7%
65 and older	Female	4,171	307	7.4%



Table 10
MaineCare-Only Diabetes Prevalence by HSA of Residence
Full MaineCare with Continuous Enrollment

HSA (Hospital Service Area)	Number of Members Covered	Average Age of All Members	Members with Diabetes	Percent of Members with Diabetes	Age- Adjusted Rate
TOTAL	143,299	22.3	5,074	3.5%	3.5%
PRESQUE ISLE	3,090	22.3	159	5.1%	5.0%
HOULTON	3,113	23.8	155	5.0%	4.4%
BELFAST	2,760	22.6	131	4.7%	4.5%
CALAIS	2,488	23.0	117	4.7%	4.4%
CARIBOU-VAN BUREN	2,379	23.6	107	4.5%	4.0%
LINCOLN	2,206	23.0	99	4.5%	4.1%
SKOWHEGAN	5,733	23.4	232	4.0%	3.7%
FORT KENT	1,601	23.0	64	4.0%	3.5%
DOVER-DEXTER	3,722	23.0	147	3.9%	3.7%
WATERVILLE	8,731	22.4	342	3.9%	3.9%
MILLINOCKET	1,496	23.5	58	3.9%	3.5%
PITTSFIELD	3,062	22.5	118	3.9%	3.9%
FORT FAIRFIELD	1,187	21.5	45	3.8%	4.1%
BAR HARBOR	608	22.9	23	3.8%	3.6%
BANGOR	13,900	22.5	520	3.7%	3.7%
RUMFORD	2,565	22.6	95	3.7%	3.7%
ELLSWORTH	3,135	22.9	115	3.7%	3.4%
FARMINGTON	5,159	22.1	187	3.6%	3.7%
MACHIAS	2,740	23.8	99	3.6%	3.1%
NORWAY	3,531	22.8	124	3.5%	3.4%
BLUE HILL	1,141	22.9	40	3.5%	3.4%
ROCKLAND	5,205	22.1	180	3.5%	3.5%
LEWISTON	13,590	21.4	442	3.3%	3.5%
PORTLAND	19,648	22.4	623	3.2%	3.1%
AUGUSTA	8,007	21.6	253	3.2%	3.3%
BATH	2,200	21.3	67	3.0%	3.5%
BIDDEFORD	5,011	21.0	149	3.0%	3.3%
GREENVILLE	338	23.5	10	3.0%	2.7%
BRIDGTON	2,213	22.0	62	2.8%	2.9%
SANFORD	4,176	20.8	115	2.8%	3.2%
BRUNSWICK	2,744	21.5	68	2.5%	2.6%
DAMARISCOTTA	931	22.7	23	2.5%	2.4%
YORK	1,329	22.7	32	2.4%	2.4%
BOOTHBAY HARBOR	469	23.2	11	2.3%	2.1%
BERWICKS	1,532	20.2	35	2.3%	3.0%
NOT ASSIGNED	1,559	17.8	27	1.7%	2.4%



Table 11
All MaineCare Diabetes Prevalence by HSA of Residence
Includes MaineCare-Only, Dual Eligible, and TPL Members

HSA (Hospital Service Area)	Number of Members Covered	Average Age of All Members	Members with Diabetes	Percent of Members with Diabetes	Age- Adjusted Rate
TOTAL	202,987	30.8	14,687	7.2%	7.2%
FORT KENT	2,720	39.1	291	10.7%	7.3%
CARIBOU-VAN BUREN	3,714	36.2	379	10.2%	7.8%
PRESQUE ISLE	4,530	32.4	425	9.4%	8.6%
FORT FAIRFIELD	1,707	31.3	156	9.1%	8.7%
CALAIS	3,466	31.7	316	9.1%	8.7%
BAR HARBOR	889	35.1	79	8.9%	7.4%
HOULTON	4,475	34.4	397	8.9%	7.4%
BELFAST	3,775	31.3	321	8.5%	8.1%
LINCOLN	3,071	31.7	260	8.5%	8.0%
NORWAY	5,153	32.0	402	7.8%	7.3%
SKOWHEGAN	7,956	31.3	615	7.7%	7.5%
MACHIAS	3,707	33.2	285	7.7%	6.7%
ELLSWORTH	4,314	31.5	331	7.7%	7.3%
BIDDEFORD	7,457	31.2	550	7.4%	7.1%
ROCKLAND	7,175	30.7	526	7.3%	7.3%
WATERVILLE	12,116	30.2	877	7.2%	7.5%
DOVER-DEXTER	5,094	30.6	367	7.2%	7.2%
PITTSFIELD	4,215	29.7	302	7.2%	7.6%
LEWISTON	19,654	30.5	1,404	7.1%	7.3%
GREENVILLE	465	34.0	33	7.1%	6.2%
BLUE HILL	1,577	32.9	109	6.9%	6.3%
AUGUSTA	11,743	30.4	809	6.9%	7.0%
FARMINGTON	6,960	29.3	476	6.8%	7.4%
BANGOR	19,441	29.8	1,319	6.8%	7.2%
BRUNSWICK	4,011	30.8	272	6.8%	6.8%
PORTLAND	28,328	30.7	1,914	6.8%	6.9%
BOOTHBAY HARBOR	668	32.5	44	6.6%	6.0%
RUMFORD	3,488	28.9	226	6.5%	7.3%
SANFORD	5,735	28.4	367	6.4%	7.4%
MILLINOCKET	2,001	30.6	125	6.2%	6.5%
BRIDGTON	3,037	29.1	184	6.1%	6.6%
BATH	2,972	27.6	175	5.9%	7.2%
BERWICKS	2,050	26.8	112	5.5%	7.1%
YORK	2,031	31.9	107	5.3%	5.1%
DAMARISCOTTA	1,287	30.9	64	5.0%	5.0%
NOT ASSIGNED	2,005	23.1	68	3.4%	5.1%



Table 12
Members with Diabetes Utilization by HSA of Residence
MaineCare-Only with Continuous Enrollment

HSA (Hospital Service Area)	Members with Diabetes	ED Visits	ED Visit Rate PMPY (sorted by)	Office Visits	Office Visit Rate PMPY	Inpatient Med / Surg.	Inpatient Med/Surg. Rate PMPY
TOTAL	5,074	7,908	1.559	35,949	7.085	2,261	0.446
PITTSFIELD	118	370	3.136	1,268	10.746	80	0.678
FORT FAIRFIELD	45	135	3.000	399	8.867	40	0.889
CARIBOU-VAN BUREN	107	298	2.785	965	9.019	35	0.327
HOULTON	155	377	2.432	909	5.865	50	0.323
SKOWHEGAN	232	516	2.224	1,733	7.470	120	0.517
YORK	32	60	1.875	205	6.406	4	0.125
BELFAST	131	238	1.817	1,262	9.634	48	0.366
SANFORD	115	201	1.748	972	8.452	42	0.365
RUMFORD	95	160	1.684	731	7.695	38	0.400
BANGOR	520	852	1.638	4,042	7.773	205	0.394
LEWISTON	442	724	1.638	2,427	5.491	201	0.455
BOOTHBAY HARBOR	11	18	1.636	81	7.364	4	0.364
BERWICKS	35	57	1.629	293	8.371	19	0.543
BAR HARBOR	23	37	1.609	139	6.043	9	0.391
GREENVILLE	10	16	1.600	54	5.400	4	0.400
CALAIS	117	181	1.547	571	4.880	35	0.299
MILLINOCKET	58	89	1.534	511	8.810	38	0.655
AUGUSTA	253	385	1.522	1,233	4.874	96	0.379
DOVER-DEXTER	147	217	1.476	1,167	7.939	57	0.388
FARMINGTON	187	276	1.476	727	3.888	98	0.524
BATH	67	96	1.433	563	8.403	24	0.358
ELLSWORTH	115	156	1.357	640	5.565	118	1.026
WATERVILLE	342	461	1.348	2,618	7.655	137	0.401
BIDDEFORD	149	191	1.282	1,398	9.383	81	0.544
PORTLAND	623	797	1.279	3,628	5.823	317	0.509
PRESQUE ISLE	159	203	1.277	1,316	8.277	51	0.321
NORWAY	124	150	1.210	906	7.306	61	0.492
ROCKLAND	180	217	1.206	1,338	7.433	104	0.578
BLUE HILL	40	42	1.050	315	7.875	14	0.350
FORT KENT	64	64	1.000	552	8.625	35	0.547
LINCOLN	99	96	0.970	772	7.798	28	0.283
BRUNSWICK	68	59	0.868	629	9.250	14	0.206
BRIDGTON	62	53	0.855	435	7.016	10	0.161
MACHIAS	99	71	0.717	832	8.404	35	0.354
DAMARISCOTTA	23	14	0.609	169	7.348	8	0.348
NOT ASSIGNED	27	31	1.148	149	5.519	1	0.037



Table 13
Members with Diabetes Preventive Services by HSA of Residence
MaineCare-Only with Continuous Enrollment

HSA (Hospital Service Area)	Members with Diabetes	Percent With Diabetes Education (sorted by)	Percent with HbA1C Test	Percent with LDL-C Screen	Percent with Eye Exam	Percent with Micro albuminuria Test	Percent with ACE Inhibitor or ARB Medication	Percent with Foot Examination
TOTAL	5,074	22%	75%	69%	60%	29%	47%	19%
FORT KENT	64	42%	73%	78%	69%	48%	44%	20%
BELFAST	131	37%	76%	57%	55%	18%	40%	12%
BAR HARBOR	23	35%	61%	61%	48%	30%	40%	4%
DOVER-DEXTER	147	34%	82%	76%	65%	39%	56%	14%
SANFORD	115	34%	81%	79%	63%	37%	45%	15%
WATERVILLE	342	29%	78%	73%	68%	23%	55%	18%
HOULTON	155	28%	76%	68%	63%	25%	41%	21%
YORK	32	28%	72%	66%	38%	22%	41%	13%
FARMINGTON	187	27%	76%	64%	61%	28%	40%	21%
CARIBOU-VAN BUREN	107	26%	72%	84%	70%	32%	51%	18%
BLUE HILL	40	25%	88%	65%	65%	28%	45%	5%
ROCKLAND	180	25%	71%	68%	54%	15%	42%	14%
BRUNSWICK	68	25%	69%	65%	51%	32%	46%	18%
LEWISTON	442	25%	75%	71%	62%	31%	48%	22%
AUGUSTA	253	24%	75%	66%	58%	30%	42%	22%
FORT FAIRFIELD	45	22%	76%	80%	73%	20%	58%	18%
DAMARISCOTTA	23	22%	65%	57%	48%	22%	35%	13%
BANGOR	520	21%	75%	67%	65%	32%	48%	21%
SKOWHEGAN	232	21%	82%	72%	62%	32%	50%	17%
LINCOLN	99	20%	78%	65%	59%	32%	46%	28%
GREENVILLE	10	20%	80%	20%	30%	10%	40%	10%
MILLINOCKET	58	19%	83%	72%	57%	24%	45%	24%
PRESQUE ISLE	159	19%	74%	64%	64%	16%	49%	26%
PORTLAND	623	18%	77%	67%	55%	35%	52%	23%
PITTSFIELD	118	17%	68%	68%	61%	35%	42%	21%
NORWAY	124	16%	81%	73%	60%	35%	52%	16%
BRIDGTON	62	16%	74%	69%	39%	32%	40%	21%
BATH	67	15%	67%	54%	48%	13%	36%	16%
BIDDEFORD	149	14%	71%	66%	56%	32%	50%	20%
ELLSWORTH	115	14%	61%	67%	60%	41%	43%	17%
BERWICKS	35	11%	71%	69%	51%	31%	40%	20%
CALAIS	117	11%	64%	68%	71%	20%	54%	9%
RUMFORD	95	11%	74%	65%	60%	27%	39%	9%
BOOTHBAY HARBOR	11	9%	73%	55%	27%	9%	45%	9%
MACHIAS	99	9%	58%	72%	57%	24%	52%	5%
NOT ASSIGNED	27	22%	59%	63%	48%	37%	26%	15%

* Some lab tests are bundled in administrative claims data at Federally Qualified Health Centers, Rural Health Centers, and other clinics. Interpretation of variation in HbA1c, Microalbuminuria, and LDL-C screen rates should be made with caution.



Table 14
Impact of Diabetes on Total MaineCare Costs by HSA of Residence
MaineCare-Only

HSA (Hospital Service Area)	Total Payments (millions)	Total Payments for Members with Diabetes (Millions)	% of Total Payments Due to Members with Diabetes (sorted by)	% of Hospital Inpatient Payments Due to Members with Diabetes
TOTAL	\$883.7	\$88.1	10%	18%
FORT FAIRFIELD	\$7.0	\$1.2	17%	34%
ROCKLAND	\$28.5	\$4.0	14%	28%
PRESQUE ISLE	\$17.9	\$2.4	13%	16%
SKOWHEGAN	\$35.8	\$4.6	13%	25%
HOULTON	\$18.8	\$2.4	13%	15%
CARIBOU-VAN BUREN	\$15.8	\$2.0	13%	22%
MILLINOCKET	\$9.2	\$1.1	12%	32%
BELFAST	\$17.5	\$2.0	12%	20%
PITTSFIELD	\$19.3	\$2.2	11%	22%
BLUE HILL	\$5.6	\$0.6	11%	21%
FARMINGTON	\$27.1	\$2.9	11%	21%
LINCOLN	\$11.5	\$1.2	11%	15%
CALAIS	\$14.7	\$1.6	11%	16%
RUMFORD	\$16.7	\$1.7	10%	18%
AUGUSTA	\$51.8	\$5.4	10%	16%
NORWAY	\$17.5	\$1.8	10%	26%
LEWISTON	\$87.2	\$8.6	10%	17%
WATERVILLE	\$54.7	\$5.3	10%	17%
FORT KENT	\$11.4	\$1.1	10%	15%
BANGOR	\$104.3	\$10.0	10%	13%
PORTLAND	\$124.2	\$11.9	10%	21%
BAR HARBOR	\$2.7	\$0.3	9%	15%
BIDDEFORD	\$36.3	\$3.4	9%	20%
DOVER-DEXTER	\$19.7	\$1.8	9%	12%
SANFORD	\$21.3	\$1.9	9%	19%
BATH	\$12.9	\$1.1	9%	15%
BERWICKS	\$6.1	\$0.5	8%	17%
ELLSWORTH	\$19.5	\$1.6	8%	15%
MACHIAS	\$14.9	\$1.1	8%	10%
GREENVILLE	\$1.6	\$0.1	7%	13%
YORK	\$7.4	\$0.5	7%	3%
BRIDGTON	\$9.8	\$0.6	6%	3%
BOOTHBAY HARBOR	\$1.6	\$0.1	5%	10%
DAMARISCOTTA	\$4.9	\$0.3	5%	5%
BRUNSWICK	\$14.8	\$0.7	5%	5%
NOT ASSIGNED	\$13.6	\$0.3	2%	0%



Table 15
Impact of Diabetes on Total MaineCare Costs by HSA of Residence
Includes MaineCare-Only, Dual Eligible, and TPL

HSA (Hospital Service Area)	Total Payments (millions)	Total Payments for Members with Diabetes (Millions)	% of Total Payments Due to Members with Diabetes (sorted by)
TOTAL	\$1,636.4	\$242.7	15%
FORT FAIRFIELD	\$10.7	\$2.5	23%
PRESQUE ISLE	\$32.3	\$6.6	21%
CARIBOU-VAN BUREN	\$32.2	\$6.5	20%
GREENVILLE	\$2.9	\$0.6	20%
FORT KENT	\$26.3	\$4.9	19%
LINCOLN	\$19.1	\$3.4	18%
ROCKLAND	\$52.3	\$9.2	18%
CALAIS	\$22.1	\$3.8	17%
SKOWHEGAN	\$62.2	\$10.5	17%
NORWAY	\$37.7	\$6.3	17%
BELFAST	\$29.1	\$4.6	16%
PITTSFIELD	\$29.9	\$4.6	15%
HOULTON	\$37.6	\$5.8	15%
AUGUSTA	\$104.2	\$16.0	15%
BAR HARBOR	\$5.9	\$0.9	15%
DOVER-DEXTER	\$33.5	\$5.1	15%
BERWICKS	\$11.7	\$1.8	15%
FARMINGTON	\$43.4	\$6.5	15%
WATERVILLE	\$93.5	\$13.9	15%
BLUE HILL	\$10.6	\$1.6	15%
MILLINOCKET	\$14.4	\$2.1	15%
RUMFORD	\$25.6	\$3.7	14%
MACHIAS	\$24.2	\$3.5	14%
BIDDEFORD	\$76.3	\$10.8	14%
LEWISTON	\$166.7	\$23.7	14%
SANFORD	\$39.7	\$5.6	14%
BRUNSWICK	\$34.0	\$4.7	14%
PORTLAND	\$254.7	\$35.4	14%
BANGOR	\$178.8	\$24.7	14%
ELLSWORTH	\$33.8	\$4.7	14%
BOOTHBAY HARBOR	\$3.3	\$0.4	14%
BATH	\$23.3	\$3.0	13%
BRIDGTON	\$18.5	\$2.1	11%
YORK	\$14.8	\$1.4	10%
DAMARISCOTTA	\$10.6	\$0.9	8%
NOT ASSIGNED	\$20.2	\$1.1	6%



Appendix: MaineCare Diabetes Study Methods

The Maine Health Information Center used enrollment and claims data from the Maine Medicaid Decision Support System (MMDSS) for this study. The experience of MaineCare members during the two fiscal year periods, July 1, 2001 - June 30, 2002 (FY2002) and July 1, 2002 – June 30, 2003 (FY2003) was evaluated. For each covered member a person-level summary record was constructed containing demographic, cost, utilization, and preventive service indicators. MaineCare members with diabetes were identified using NCQA HEDIS 2004¹¹ specifications as follows:

The member was dispensed insulin or oral hypoglycemics/antihyperglycemics during the two-year period

OR

The member had two face-to-face encounters with different dates of service in an ambulatory care setting or non-acute inpatient setting or one face-to-face encounter in an acute inpatient or emergency room setting during the two-year period with a diagnosis of diabetes.

HEDIS2004 and other coding used to identify MaineCare diabetics

1. MMDS GPI codes were used to identify anti-diabetic and insulin medications	270000, 271000, 271010, 271020, 271030, 271040, 272000, 273000
2. HEDIS2004 ICD-9 diabetes diagnosis codes	250, 357.2, 362.0, 366.41, 648.0
3a. HEDIS2004 CPT and revenue codes used to identify ambulatory care or non-acute setting encounters	92002-92014, 99201-99205, 99211-99215, 99217-99220, 99241-99245, 99271-99275, 99289, 99290, 99301-99303, 99311-99313, 99321-99323, 99331-99333, 99341-99355, 99384-99387, 99394-99397, 99401-99404, 99411, 99412, 99420, 99429, 99499, U49x-U53x, U55x-U59x, U65x, U66x, U76x, U77x, U82x-U85x, U88x, U92x, U94x, U96x, U972-U979, U982-U986, U988, U989
3b. Additional CPT codes used to identify ambulatory care or non-acute setting encounters for children	99381-99383, 99391-99393
3c. Additional MaineCare local codes used to identify ambulatory care or non-acute setting encounters	FQHC, FQH3, FQH5, FQH6, RHC, RH001, RH002, M0064, Z9620, Z9630, Z9631, Z9632, Z9633, Z9635, Z9637, Z9639, Z9650, Z9651, Z9652,
4. HEDIS2004 CPT and revenue codes used to identify acute inpatient or emergency department encounters	99221-99223, 99231-99233, 99238-99239, 99251-99255, 99261-99263, 99281-99288, 99291-99292, 99356-99357, U10x-U16x, U20x-U22x, U45x, U72x, U80x, U987, U981



For all members (with or without a diagnosis of diabetes) utilization, cost, preventive services, and comorbid medical conditions were tracked utilizing the coding listed in the following tables:

MaineCare Utilization and Diabetes Preventive Care Measure Coding

Measure	Codes
Emergency Department Visits	Revenue code 450. Hospital urgicenter visits (456) not included
Inpatient Hospitalizations – Maternity	Category of Service 1 and ICD-9 diagnosis 630-677, 760-779, V3x
Inpatient Hospitalizations – Mental & Substance	Category of Service 2 or Category of Service 1 and ICD-9 diagnosis 290-319
Inpatient Hospitalizations – Medical / Surgical	Category of Service 1 and ICD-9 diagnosis not 290-319, 630-677, 760-779, V3x
Office visit encounter codes (includes both standard CPT/HCPC and MaineCare non-standard codes)	FQHC,FQH3,FQH5,FQH6,G0071,G0072,G0073,G0074,G0075,G0076,G0077,G0078,G0079,G0080,G0081,G0082,G0090,G0092,M0064,RHC,RH001,RH002,ZPN1,ZPN2,ZPN3,ZPN4,ZPN5,ZPN6,ZPN7,ZPN8,ZPN9,ZPW1,ZPW2,ZPW3,ZPW4,ZPW5,ZPW6,ZPW7,ZPW8,ZPW9,Z4127,Z4155,Z9616,Z9617,Z9618,Z9619,Z9620,Z9630,Z9631,Z9632,Z9633,Z9635,Z9637,59400,59410,59425,59426,59430,59610,59618,90000,90010,90015,90020,90040,90050,90070,90757,90801,90842,90843,90844,90846,90847,90849,90853,90857,90862,90875,90880,90882,90899,95115,95117,99058,99201,99202,99203,99204,99205,99211,99212,99213,99214,99215,99241,99242,99243,99244,99245,99354,99355,99382,99383,99384,99385,99386,99387,99391,99392,99393,99394,99395,99396,99397,99401,99402,99403,99404,99411,99412,99429,90802,90804,90805,90806,90807,90808,90809,90810,90811,90812,90813,90814,90815,90865,90885,G0101,ZPN10,ZPW10,Z9639,Z9650,Z9651,Z9652
Endocrinologist encounters	Specialty of servicing provider is 25 (ID=19)
Diabetes Education Note that coding was insufficient in the MMDSS claims data file to distinguish ADEF program visits from other education visits	Procedure codes DT, FQH61, RH063, U942, Z9646, G0108, G0109, S9141, S9455, S9460, S9465, DM1, DM2, 97802, 97803, 97804
Foot Exam	Visit with Podiatrist or CPT codes indicating foot care
HEDIS2004: HbA1c Test	CPT procedure code 83036
HEDIS2004: Eye Exam	CPT procedure codes 67101, 67105, 67107, 67108, 67110, 67112, 67141, 67145, 67208, 67210, 67218, 67227, 67228, 92002, 92004, 92012, 92014, 92018, 92019, 92225, 92226, 92230, 92235, 92240, 92250, 92260, 92287 or 99204, 99205, 99214, 99215, 99242, 99243, 99244, 99245 if the provider specialty was ophthalmology (40,78) or the provider type was optometrist (7). ICD-9-CM procedure codes (14.1-14.5, 14.9, 95.02-95.04, 95.11, 95.12, 95.16) were not used; our analysis indicated that very few claims were billed with these codes and identification of these services was redundant to the CPT procedure coding in the claims data.
HEDIS2004: LDL-C screening	CPT procedure codes 80061, 83715, 83716, 83721, (83717 added per request).
HEDIS2004: Microalbuminuria Test Note nephropathy was not identified for this report	CPT procedure codes 82042, 82043 82044 or 84155, 84160, 84165 with code 81050



MaineCare Payment Cost Category Coding

Payment Cost Category	MMDSS Category of Service Codes
Hospital Inpatient	1,2
Hospital Outpatient	4
Physician and Related Practitioners	6,7,8,9,13,18,27,30,31,32,33,37,42,43,46,47,53,60,63
Prescription Drugs and Related	10, 14,16,17,45
Long Term Care and Related	3,11,21,22,23,36,39,41,50,55,56,57,58,59,61
Behavioral Health Services	12,26,28,35,38,40,48,62,64,66
Other Medicaid Services	15,24,25,29,44,52,65,67,5,49,54

ICD-9-CM Codes Used to Identify Comorbid Medical Conditions

From Elixhauser, A., et.al. Comorbidity Measures for Use with Administrative Data. Medical Care, 1998;36(1):8-27. <http://www.ahcpr.gov/data/hcup/comorbid.htm>

Comorbidity	ICD-9-CM codes
Congestive heart failure	398.91, 402.11, 402.91, 404.11, 404.13, 404.91, 404.93, 428.0-428.9
Cardiac arrhythmias	426.10, 426.11, 426.13, 426.2-426.53, 426.6-426.89, 427.0, 427.2, 427.31, 427.60, 427.9, 785.0, V45.0, V53.3
Valvular disease	093.20-093.24, 394.0-397.1, 424.0-424.91, 746.3-746.6, V42.2, V43.3
Pulmonary circulation disorders	416.0-416.9, 417.9
Peripheral vascular disorders	440.0-440.9, 441.2, 441.4, 441.7, 441.9, 443.1-443.9, 447.1, 557.1, 557.9, V43.4
Hypertension	401.1, 401.9, 402.10, 402.90, 404.10, 404.90, 405.11, 405.19, 405.91, 405.99
Paralysis	342.0-342.12, 342.9-344.9
Other neurological disorders	331.9, 332.0, 333.4, 333.5, 334.0-335.9, 340, 341.1-341.9, 345.00-345.11, 345.40-345.51, 345.80-345.91, 348.1, 348.3, 780.3, 784.3
Chronic pulmonary disease	490-492.8, 493.00-493.91, 494, 495.0-505, 506.4
Hypothyroidism	243-244.2, 244.8, 244.9
Renal failure	403.11, 403.91, 404.12, 404.92, 585, 586, V42.0, V45.1, V56.0, V56.8
Liver disease	070.32, 070.33, 070.54, 456.0, 456.1, 456.20, 456.21 571.0, 571.2, 571.3, 571.40-571.49, 571.5, 571.6, 571.8, 571.9, 572.3, 572.8, V42.7
Peptic ulcer disease excluding bleeding	531.70, 531.90, 532.70, 532.90, 533.70, 533.90, 534.70, 534.90, V12.71
AIDS: Acquired immune deficiency syndrome	042-044.9
Lymphoma	200.00-202.38, 202.50-203.01, 203.8-203.81, 238.6, 273.3, V10.71, V10.72, V10.79
Metastatic cancer	196.0-199.1
Solid tumor without metastasis	140.0-172.9, 174.0-175.9, 179-195.8, V10.00-V10.9
Rheumatoid arthritis/collagen vascular diseases	701.0, 710.0-710.9, 714.0-714.9, 720.0-720.9, 725
Coagulopathy	2860-2869, 287.1, 287.3-287.5
Obesity	278.0
Weight loss	260-263.9
Fluid and electrolyte disorders	276.0-276.9
Blood loss anemia	2800
Deficiency anemias	280.1-281.9, 285.9
Alcohol abuse	291.1, 291.2, 291.5, 291.8, 291.9, 303.90-303.93, 305.00-305.03, V113
Drug abuse	292.0, 292.82-292.89, 292.9, 304.00-304.93, 305.20-305.93
Psychoses	295.00-298.9, 299.10-299.11
Depression	300.4, 301.12, 309.0, 309.1, 311
<i>Tracked but not used as comorbidity</i>	
Diabetes, uncomplicated	250.00-250.33
Diabetes, complicated	250.40-250.73, 250.90-250.93



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¹⁶ Comprehensive Diabetes Care. Medicaid HEDIS 2003 Audit Means, Percentiles and Ratios. National Committee for Quality Assurance (NCQA). <http://www.ncqa.org/programs/HEDIS>.

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Limitations of comparing MaineCare results to NCQA HEDIS results are described below.

(1) MaineCare results were based on the administrative claims data in the MMDSS system. Health plans reporting to NCQA can supplement administrative claims data with medical chart reviews; a process known as the “hybrid” method. Ninety-nine percent of plans reporting to NCQA used the “hybrid” method to determine the Comprehensive Diabetes Care measures.

(2) NCQA HEDIS specifications for eye exam allow for inclusion of an eye exam during the previous year, if the exam during the previous year had a negative result. Since MaineCare MMDSS claims data does not contain test results, a negative test result could not be determined. Eye exams during both the current (FY2003) and prior (FY2002) were included in calculation of the MaineCare measure.

(3) We measured the occurrence of the microalbuminuria test only; evidence of patients with nephropathy was not measured. This would explain, in part, the lower MaineCare rate compared to the HEDIS national rates.

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